

CLAIMS

What is claimed is:

1. A method for inhibiting the crystallization of boric acid comprising the steps of dissolving a source of boric acid in water and a vitrifying agent selected from the group consisting of amino alcohols and amino acids to form an aqueous mixture and allowing the aqueous mixture to dry, thereby forming a vitreous boric acid-containing residue.
2. The method of claim 1 wherein the mole ratio of the vitrifying agent to boric acid is above about 0.25:1 and below about 1:1 and wherein the aqueous mixture is applied to a surface of a substrate before it is allowed to dry, thereby forming a vitreous boric acid-containing residue on and/or in the substrate.
3. The method of claim 1 wherein the mole ratio of the vitrifying agent to boric acid is in the range of from about 0.3:1 to about 1:1.
4. The method of claim 1 wherein the vitrifying agent is selected from the group consisting of 2-amino-2-methyl-1-propanol, ethanolamine, tris(hydroxymethyl)aminomethane, 5-aminopentanol, and lysine.
5. The method of claim 1 wherein the boric acid-containing residue is a solid.
6. The method of claim 1 wherein the boric acid-containing residue is a viscous fluid.
7. The method according to claim 1 wherein the aqueous mixture is applied to cotton batting, wood, wood products, engineered wood, paper, cellulose insulation or gypsum wallboard.
8. The method according to claim 2 wherein the vitreous boric acid-containing residue forms a coating on the surface of the substrate.
9. The method according to claim 8 wherein the coating is a hard vitreous boric acid-containing layer.
10. The method according to claim 8 wherein the coating is a tacky vitreous boric acid-containing layer.
11. The method according to claim 2 wherein the aqueous mixture penetrates into the substrate and dries within the substrate, thereby depositing a vitreous boric acid-containing residue within the substrate.

12. A method for protecting a combustible material against fire comprising the steps of: (a) dissolving a source of boric acid in water and a vitrifying agent selected from the group consisting of amino alcohols and amino acids to form an aqueous mixture; (b) applying the aqueous mixture to a surface of the combustible material; and (c) allowing the aqueous mixture to dry such that a vitreous boric acid-containing residue is deposited on the surface of the combustible material and/or within the combustible material, thereby enhancing the fire retardant nature of the combustible material.
13. The method according to claim 12 wherein the combustible material is cotton batting.
14. The method according to claim 13 wherein the cotton batting is heated after the aqueous mixture is applied.
15. A fire retardant article comprising a combustible material and further comprising a vitreous boric acid-containing residue, prepared according to the method of claim 12.
16. A method for protecting wood or lignocellulosic-based products against decay and insect attack comprising the steps of: (a) dissolving a source of boric acid in water and a vitrifying agent selected from the group consisting of amino alcohols and amino acids to form an aqueous mixture; (b) applying the aqueous mixture to the wood or lignocellulosic-based product; (c) allowing the aqueous mixture to penetrate into the wood or lignocellulosic-based product; and (d) allowing the aqueous mixture to dry within the substrate, depositing a vitreous boric acid-containing residue, thereby providing protection against decay and insect attack.
17. An article comprising wood or lignocellulosic-based material and further comprising a vitreous boric acid-containing residue, prepared according to the method of claim 16.
18. An aqueous composition comprising boric acid, 2-amino-2-methyl-1-propanol and water wherein the mole ratio of 2-amino-2-methyl-1-propanol to boric acid is above about 0.25:1 and below about 1:1.
19. The composition of claim 18 wherein the concentration of boric acid is in the range of about 35% to 57% by weight.
20. The composition of claim 19 wherein the mole ratio of 2-amino-2-methyl-1-propanol to boric acid is at least about 0.3:1 and the concentration of boric acid is up to about 50% by weight.

21. An aqueous composition comprising boric acid, a vitrifying agent and water wherein the vitrifying agent is selected from the group consisting of 2-amino-2-methyl-1-propanol, tris(hydroxymethyl)aminomethane, 5-aminopentanol, and lysine and the mole ratio of the vitrifying agent to boric acid is above about 0.25:1 and below about 1:1.
22. Use of a vitrifying agent to prevent the crystallization of boric acid from a boric acid-containing aqueous mixture upon drying of the mixture, wherein the vitrifying agent is selected from the group consisting of amino alcohols and amino acids.
23. Use of a vitrifying agent to obtain a vitreous boric acid-containing residue from an aqueous boric acid-containing mixture upon drying of the mixture, wherein the vitrifying agent is selected from the group consisting of amino alcohols and amino acids.